WHAT WE CLAIM IS

1. A thermomechanical treatment method for a Fe-Mn-Si-based shape memory alloy with Nb, C addition comprising:

deforming a Fe-Mn-Si-based shape memory alloy with Nb, C addition by a deformation ratio of from 5% to 40% at room temperature, and

subjecting the deformed alloy to aging heating treatment to precipitate NbC carbides.

2. A thermomechanical treatment method for a Fe-Mn-Si-based shape memory alloy with Nb, C addition as claimed in claim 1, wherein the Fe-Mn-Si-based shape memory alloy with Nb, C addition comprises, as alloy components, Mn: 15% to 40% by weight, Si: 3% to 15% by weight, Nb: 0.1% to 1.5% by weight, C: 0.01% to 0.2% by weight, and Fe and inevitable impurities: residual amount, wherein the atomic ratio Nb/C between Nb and C is 1 or more.

3. A thermomechanical treatment method for a Fe-Mn-Si-based shape memory alloy with Nb, C addition as claimed in claim 1, wherein the Fe-Mn-Si-based shape memory alloy with Nb, C addition comprises, as alloy components, Mn: 15% to 40% by weight, Si: 3% to 15% by weight, Cr: 1% to 20% by weight, Nb: 0.1% to 1.5% by weight, C: 0.01% to 0.2% by weight, and Fe and inevitable impurities: residual amount, wherein the atomic ratio Nb/C between Nb and C is 1 or more.

4. A thermomechanical treatment method for a Fe-

Mn-Si-based shape memory alloy with Nb, C addition as claimed in claim 1, wherein the Fe-Mn-Si-based shape memory alloy with Nb, C addition comprises, as alloy components, Mn: 15% to 40% by weight, Si: 3% to 15% by

5   weight, Cr: 1% to 20% by weight, Ni: 0.1% to 20% by weight, Nb: 0.1% to 1.5% by weight, C: 0.01% to 0.2% by weight, and Fe and inevitable impurities: residual amount, wherein the atomic ratio Nb/C between Nb and C is 1 or more.

10   5. A thermomechanical treatment method for a Fe-Mn-Si-based shape memory alloy with Nb, C addition as claimed in any one of claims 2 through 4, wherein the atomic ratio between Nb and C is set in a range of from 1.0 to 1.2.

15   6. A thermomechanical treatment method for a Fe-Mn-Si-based shape memory alloy with Nb, C addition as claimed in any one of claims 2 through 5, wherein the Fe-Mn-Si-based shape memory alloy with Nb, C addition contains, as impurities, Cu: 3% by weight or less, Mo:

20   2% by weight or less, Al: 10% by weight or less, Co: 30% by weight or less, and/or N: 5000 ppm or less.

       7. A thermomechanical treatment method for a Fe-Mn-Si-based shape memory alloy with Nb, C addition as claimed in any one of claims 1 through 6, wherein the

25   conditions for the aging heating treatment are a temperature range of 400°C to 1000°C and a time period from 1 minute to 2 hours.